REMARKS

This is a divisional application of U.S. Serial No. 09/055,583, filed on April 6, 1998, now issued as U.S. Patent No. 6,310,921.

An IDS and form PTO 1449 were filed on October 24, 2001 along with the filing of this divisional application, where it was requested that the references cited in the prosecution of the parent application, now U.S. Patent No. 6,310,921, be considered in the prosecution of this divisional application. The relevance of those references was set forth in the prosecution of U.S. Patent No. 6,310,921. It is believed that the claims of the present invention are patentable over the previously-cited prior art references based on the following remarks.

I. *The Media Processing Apparatus of the Present Invention Includes an I/O Processing Means Which Receives Data at a Non-Fixed Rate and a Decode Processing Means Which Decodes Data at a Predetermined Rate Irrespective of the Rate at which Data Is Processed By The I/O Processing Means*

The present invention is directed to a media processing apparatus having a multi-processor architecture with separate processors assigned to performing separate respective functions for efficiently decoding streams of data. New Claim 72 recites an input/output (I/O) processing means for performing an I/O processing of data received and a decode processing means for performing decode processing of the data processed by the I/O processing means. The I/O processing means receives data at a non-fixed rate. The media processing apparatus may be provided in a system such as a satellite broadcast tuner (see page 24, lines 14-22 of the specification), where broadcast MPEG data streams which are received asynchronously at a random or non-fixed rate. Other external factors could effect the transfer of data to the I/O processing means, so I/O processing means must be capable of receiving data and processing such data at a non-fixed rate.

The decode processing means of the present invention then performs decode processing of the data processed by the I/O processing means at a predetermined rate. In this manner, the decode processing means continues to decode data according to a predetermined rate irrespective of the non-fixed rate at which data is received by the I/O processing means. In this manner, the

decode processing means can be devoted to performing decode processing of data without being affected by external factors which cause the data to be received at an asynchronous rate by the I/O processing means.

II. *The Media Processing Apparatus of the Present Invention Includes a Sequential Processor Means which Performs Header Analysis on Macroblocks of Video Data*

Claims 16 and 42 recite that the media processing apparatus includes a sequential processor means which performs header analysis for analyzing a header which is assigned to a block of data, wherein the block of data is a macroblock including a plurality of video blocks which each include luminance blocks and color-difference blocks. For example, one macroblock may comprise an image of 16 x 16 pixels represented by four luminance blocks and two color-difference blocks, where each luminance block and each color-difference block is composed of 8 x 8 pixels.

Claims 16 and 42 are characterized in that the sequential processing means and the routine processing means share the workload in processing the input data stream. Namely, (a) the sequential processing means performs the header analysis of the data stream in units of macroblocks, while (b) the routine processing means decodes the compressed video data in units of macroblocks but does not perform any header analysis. By splitting the tasks performed between the sequential processing means and the routine processing means, Applicants have found that this workload sharing provided by the media processing apparatus of Claims 16 and 42 more effectively decodes the compressed A/V data in the input data stream. Each of the respective tasks performed by the sequential processing means and the routine processing means can be quite substantial. Specifically, the amount of calculation in decoding compressed video data performed by the routine processing means can be quite substantial, while the header analysis performed by the sequential processing means requires a lot of condition judgments. Claims 16 and 42 allow the sequential processing means and the routine processing means to perform different processes, resulting in an improvement in processing efficiency

Applicants note that U.S. Patent No. 5,946,052 issued to *Ozkan* was cited against similar claims of the present invention in the parent application, now U.S. Patent No. 6,310,921. In citing *Ozkan* against these claims in the parent application, it was asserted that the transport processor 55

and the MPEG decoder 60 of *Ozkan* respectively correspond to the sequential processing means and the routine processing means of the present invention. Applicants wish to point out that the transport processor 55 of *Ozkan* merely performs header analysis of the transport stream, namely analysis of the header of a packet called a transport packet having a fixed length, separates the transport stream into compressed video data and compressed audio data in accordance with the analysis results, and supplies the separated data to the MPEG decoder (audio/video decoder) 60. The transport processor 55 does not perform the analysis of a macroblock header in the compressed video data, as performed by the sequential processing means of amended Claims 16 and 42. Clearly, the transport processor 55 of *Ozkan* is quite different from the sequential processing means of the present invention.

Referring to FIG. 5 of the present invention, a timing chart showing the hierarchical structure of an MPEG stream is shown with a plurality of slices (or levels) of the stream. *Ozkan* merely performs header analysis on a first slice or level of the transport stream, namely analysis of the header of a packet in order to separate the transport stream into compressed video data and compressed audio data. The separated data is sent to the MPEG decoder (audio/video decoder) 60 for decoding. There is no disclosure in *Ozkan* of further analysis of headers within blocks of the separated compressed video data (macroblocks). To the contrary, the sequential processing means is concerned with the lowest level, the fifth level in FIG. 5, of the MPEG data stream, where the sequential processing means analyzes headers in macroblocks of compressed video data.

It is further asserted in the parent application that *Ozkan* inherently must perform header analysis of macroblocks, since the MPEG decoder 60 operates in an MPEG environment. Assuming for arguments sake that the teachings of *Ozkan* could be extended to assert that the MPEG decoder 60 performs header analysis of macroblocks of compressed video data, Applicants note that *Ozkan* merely discloses an MPEG decoder 60 for decoding compressed video data. Thus, the MPEG decoder 60 performs functions associated with both the sequential processing means and the routine processing means of amended Claims 16 and 42. *Ozkan* does not disclose splitting these decoding tasks between separate units to share the workload and perform these tasks in parallel with one another, as recited in Claims 16 and 42. Since the sequential processing means and the routine processing means of the present invention operate in

parallel to one another, the sequential processing means waits to start analysis of the header of the next macroblock until it receives notification from routine processing means that the decoding of the compressed video in the macroblock is completed. The MPEG decoder 60 of *Ozkan* does not disclose two separate processing units for performing these split tasks.

If the Examiner believes that a telephone interview will help further the prosecution of this case, he is respectfully requested to contact the undersigned attorney at the listed telephone number.

Very truly yours,

PRICE AND GESS

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on January 18, 2002
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Date

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The paragraph which was added by the Preliminary Amendment of October 24, 2001 which appears before the paragraph beginning on page 1, after line 5, was amended as follows:

--This is a divisional application of U.S. Serial No. 09/055,583, filed on April 6, [1999] 1998, now issued as U.S. Patent No. 6,310,921.--

IN THE CLAIMS:

The following amendments were made to the claims:

1. (Amended) [A] The media processing apparatus of Claim 72, wherein the data is received as a data stream including compressed AV data, wherein the media processing apparatus [which] inputs [a] the data stream [including compressed audio data and compressed video data], decodes data in the inputted data stream, and [respectively] outputs the decoded [audio] AV data [and the decoded video data to an external display device and an external audio output device], [the media processing apparatus comprising:]

wherein said [an] input/output processing means performs said [for performing an] input/output processes [processing asynchronously occurring] at a non-fixed rate [due to an external factor], the input/output processes [processing] including inputting the data stream which is [asynchronously] inputted at a non-fixed rate, storing data in the inputted data stream into a memory, and supplying the data stored in the memory to [a] the decode processing means; and

the decode processing means which, in parallel with the input/output processing, performs [a] the decode processing where decoding of the data stream stored in the memory is mainly performed, and

wherein the decoded AV [video] data [and the decoded audio data are] is stored in the memory, and

wherein the input/output processing means reads the decoded AV [video] data [and the decoded audio data] from the memory [in accordance with respective output rates of an external display device and an external audio output device], and respectively outputs the read AV [video] data [and the read audio data to the external display device and the external audio output device].

16. (Amended) A media processing apparatus comprising:

an input means for inputting a data stream including [compressed audio data and] compressed video data;

a sequential processing means for performing a sequential processing which is [mainly] for condition judgements, the sequential processing including performing a header analysis for analyzing a header which is assigned to a predetermined unit of data (hereinafter, called a "block") in the data stream [and performing a decoding of compressed audio data of the data stream], wherein each block is a macroblock including a plurality of video blocks which each include luminance blocks and color-difference blocks; and

a routine processing means for performing, in parallel with the sequential processing, a routine processing which is mainly for routine calculations, the routine processing including a decoding of the compressed video data of the data stream for a block using a result of the header analysis, and

wherein the sequential processing means instructs the routine processing means to decode the block when the header analysis of the block is completed, and starts the header analysis of a next block when receiving notification from the routine processing means that the decoding of the block is completed.

42. (Amended) A media processing apparatus which inputs a data stream including compressed audio/video (AV) data [and compressed video data], decodes the

inputted stream data, and outputs the decoded data, the media processing apparatus comprising:

an input/output processing means for performing [an] input/output processes [processing], the input/output processes [processing] including storing a data stream [asynchronously inputted due to an external factor] in a memory;

a sequential processing means for performing a sequential processing mainly for condition judgements, the sequential processing including a header analysis of [the compressed audio data and the] compressed video data in the compressed AV data and a decoding of [the] compressed audio data in the compressed AV data, whereby the decoded audio data is stored in the memory; and

a routine processing means for performing a routine processing mainly for routine calculations on the compressed video data stored in the memory in accordance with a result of the header analysis given by the sequential processing means, the routine processing including a decoding of the compressed video data, whereby the decoded video data is stored in the memory, and

wherein the input/output processing further includes reading the decoded audio data and the decoded video data from the memory and respectively outputting the read audio data and the read video data [to an audio output device and an external display device in accordance with respective output rates],

wherein the header analysis is a header analysis of a macroblock including a plurality of video blocks.